

Determining Optimal Solar Siting Pilot for Baltimore County and City

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Principles

- Solar energy development is critical to reduce GHG emissions
- Careful siting can maximize benefits and reduce adverse impacts.
- Ensure equity so solar energy benefits are available to all
- Policies and incentives may be required to guide solar development to preferred sites



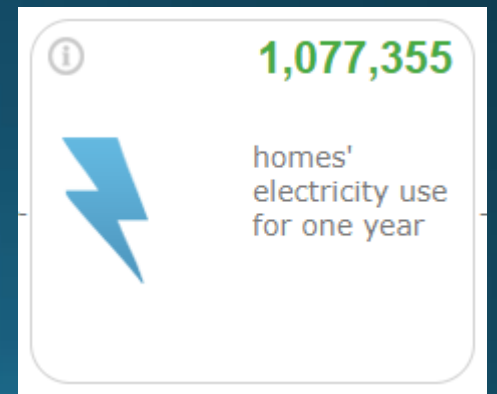
Renewable Portfolio Standard Goal

- 50% of electricity generated from renewable sources by 2030
 - 14.5% carve-out for solar energy
- By 2028, Maryland will need 8,946 MW of installed solar capacity, capable of producing 9,000 GWh of generated electricity
 - Current solar capacity is 1,250 MW (14% of the goal) – March 2020
 - We need 6 times our current capacity in 8 years to meet the RPS goal

1,006 MWh produced per 1MW capacity in Maryland in 2018

- Governor's Task Force Interim Report

**Equal to CO₂
emissions from:**



Source: EPA Greenhouse Gas
Equivalencies Calculator

Maryland RPS for Renewable Energy

Current installed capacity in Maryland

Statewide – 1100 MW (2019)

Baltimore County – 98 MW

Baltimore – 15.4 MW

Number of projects = >8,400

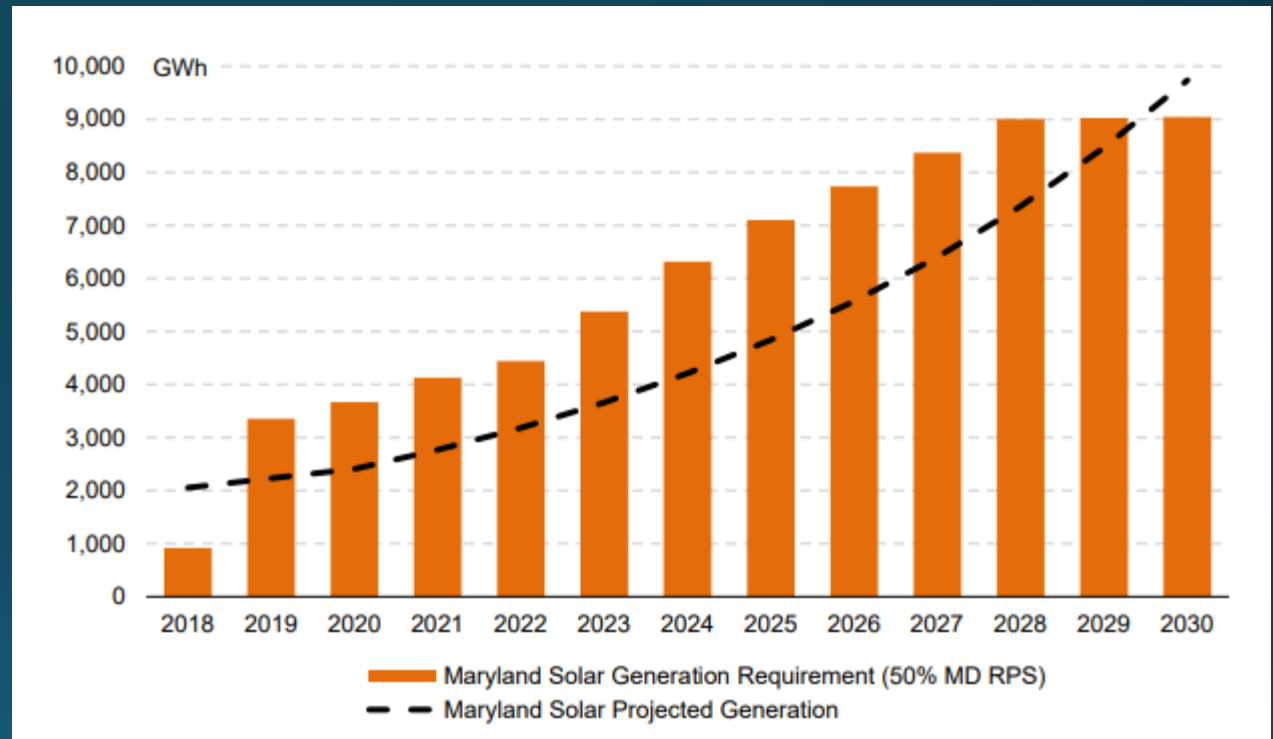
Residential rooftops 10 kw or less

Commercial, community – up to 2 MW

Utility scale – 1 MW or greater

Rule of thumb: 1MW installed capacity produces approximately 1006 MWh/year, equivalent to 1.006 GWh

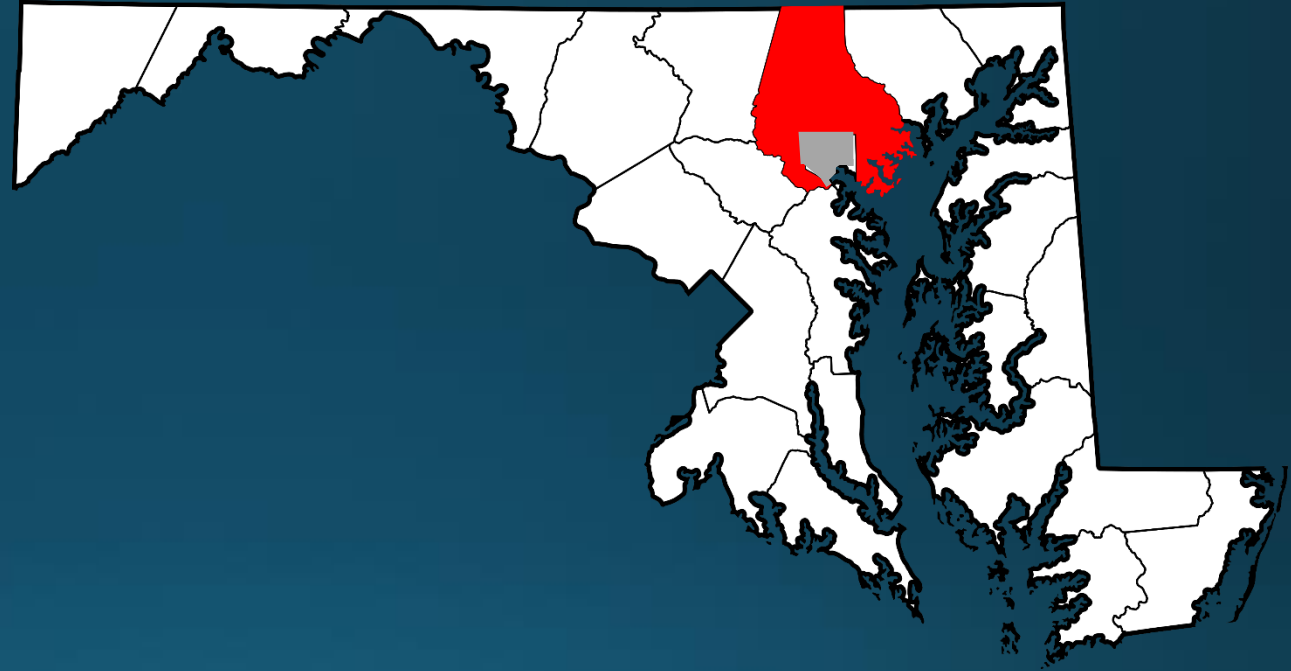
Source: PJM GATS Database



Source: Final Report Concerning the Maryland Renewable Portfolio Standard, Maryland Power Plant Research Program, Dec. 2019

What's a Fair Share?

- Statewide – Governor's Task Force estimate ranges from 7,000 to 35,000 acres of land
- Baltimore County and City, fair share ~?



What's a fair share?

Estimates ranging from 620 to 2100 GWh

Electricity consumption (EIA, BGE)

	Consumption (GWh)	% of state consumption	Solar carve-out share (GWh)
Baltimore city	6,271.54	10.1%	909.1
Baltimore County	7,295.49	11.8%	1,057.5
Baltimore - city and county combined	13,567.03	21.9%	1,966.7
Maryland	62,086.46	100.0%	9,000.0

Land Area (MD Geological Survey)

	Land area - square miles	% of state land area	Solar carve-out share (GWh)
Baltimore city	80.34	0.82%	73.5
Baltimore County	597.6	6.07%	546.4
Baltimore - city and county combined	677.94	6.89%	619.8
Maryland	9,844	100.00%	9,000.0

Population 2018 (US Census)

	Population	% of state population	Solar carve-out share (GWh)
Baltimore city	602,495	9.97%	897.4
Baltimore County	828,431	13.71%	1,233.9
Baltimore - city and county combined	1,430,926	23.68%	2,131.2
Maryland	6,042,718	100.00%	9,000.0



Ground-mounted solar competes with desirable land uses, for food production and environmental services



Conversion of prime farmland for solar energy development should be avoided because it removes the best land needed for food production.

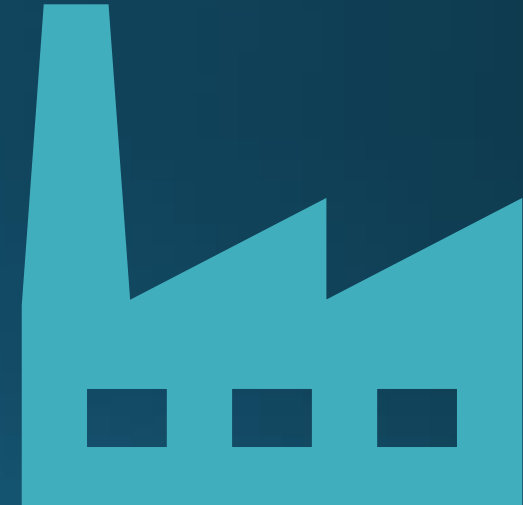


Loss of forest and ecologically sensitive lands are undesirable tradeoffs for lands critical to environmental protection and climate mitigation and resilience.

Land Use

Reclaiming degraded lands

- However, solar energy development is an opportunity to put degraded or contaminated lands and underutilized industrial sites to productive use
- Capped landfills, contaminated lands, sites adjacent to wastewater treatment plants and other abandoned sites can be repurposed for solar energy production.



Solar in the built environment



Solar energy development in the built environment does not interfere with productive use of developed lands



Solar energy production is compatible with residential, commercial and public building uses - it co-exists with and enhances these property uses



Solar parking canopies provide benefits including shaded parking, urban heat island reduction, and opportunities for electric vehicle charging

Equity

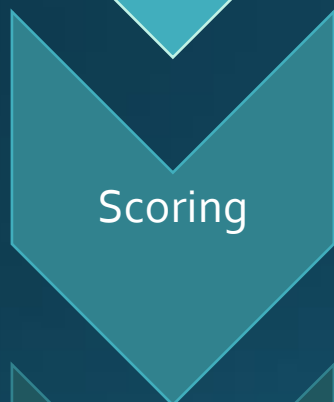
- Distributed generation with net-metering provides significant economic benefits
- Solar energy development is an important and growing source of employment; benefits to low- and moderate-income areas
- Nonprofit community solar benefits subscribers with cost savings



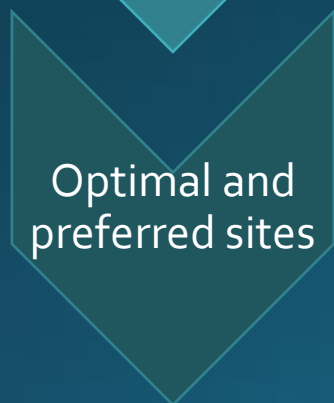
Workflow



- Pass legal screening (zoning, protected areas)
- Pass technical screening (proximity to electrical grid)



- Analyzed for environmental, equity and efficiency criteria
- Identification of opportunities on degraded sites



- Optimal sites are in the built environment or on already degraded lands
- Among ground-mounted sites not on degraded lands, preferred sites solar avoid key tradeoffs

What sites are optimal?

Optimal sites

Degraded lands

- Landfills, wastewater treatment plants

- Brownfields

- Underutilized industrial sites

Parking canopy

- Parking lots >1 acre

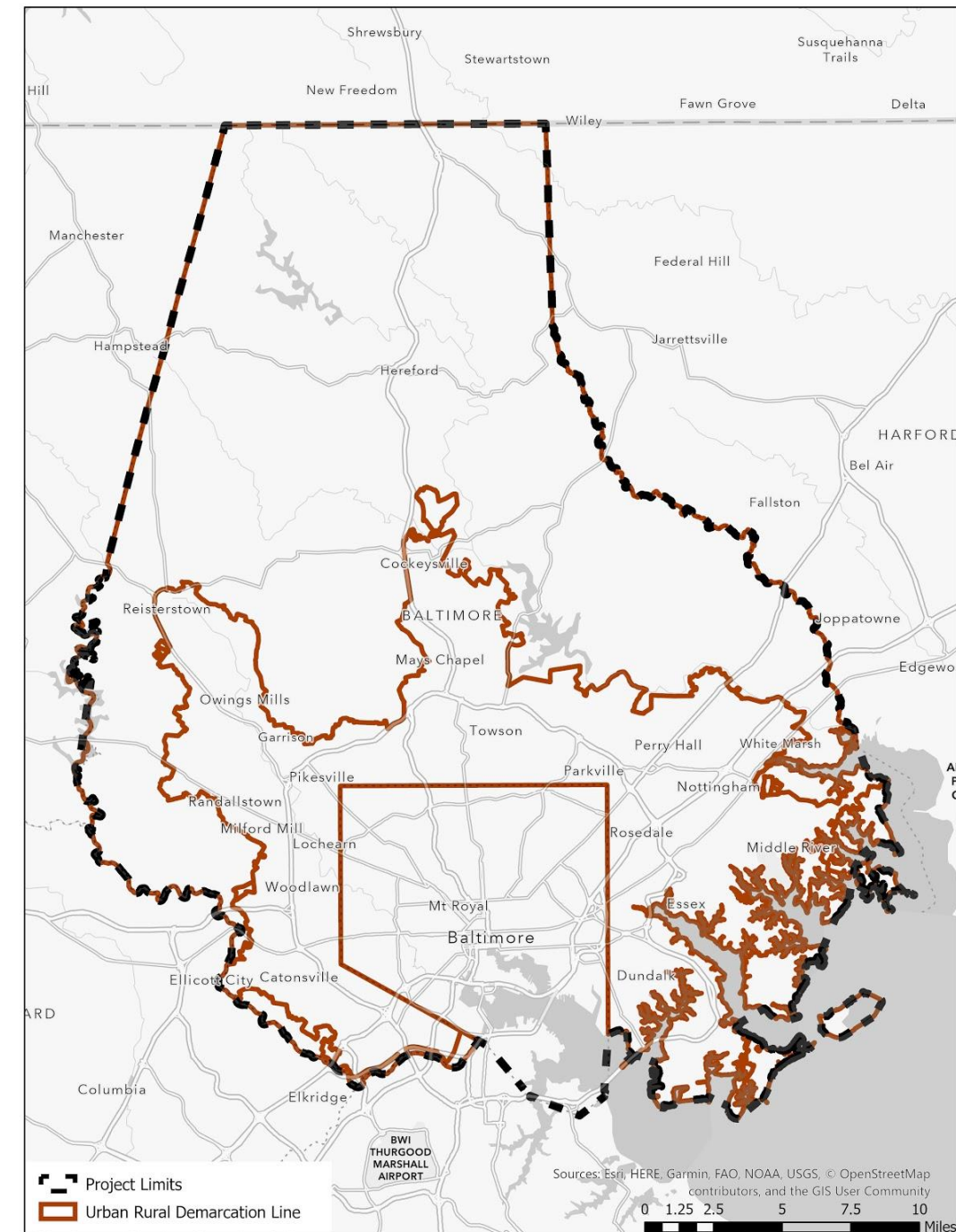
Rooftop

- Residential, commercial, industrial

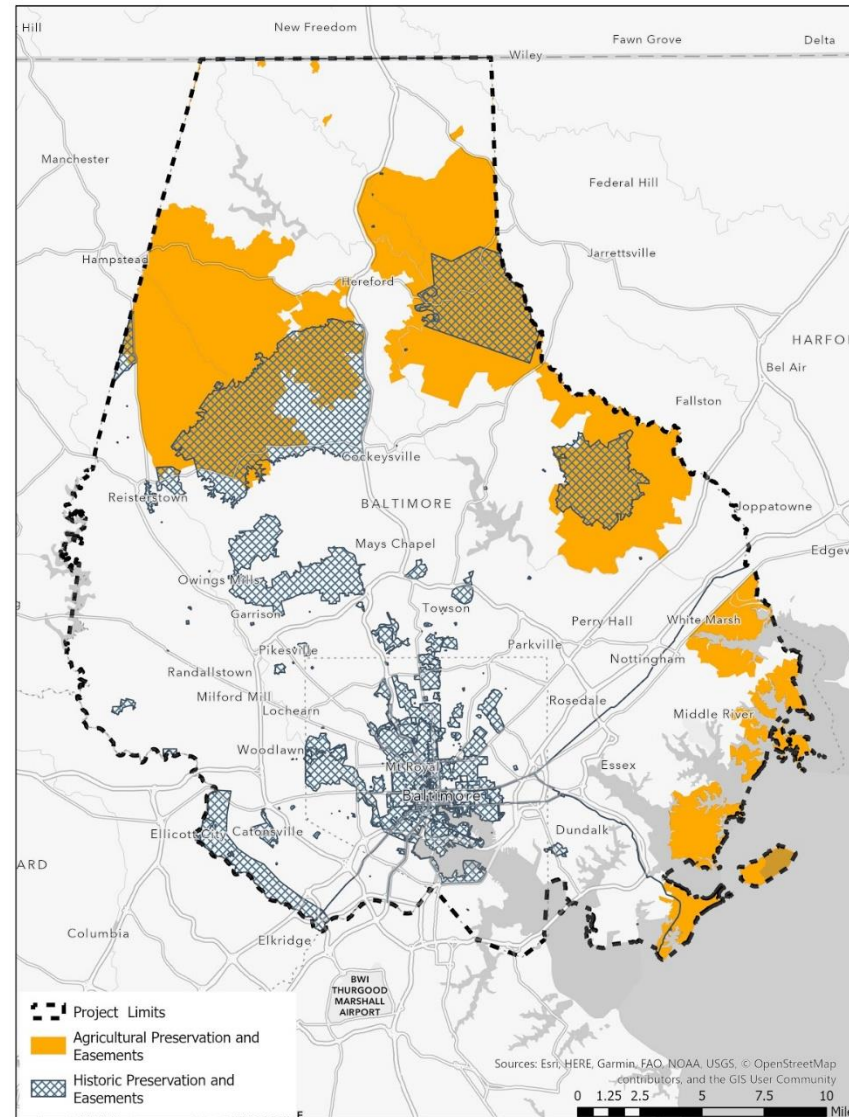
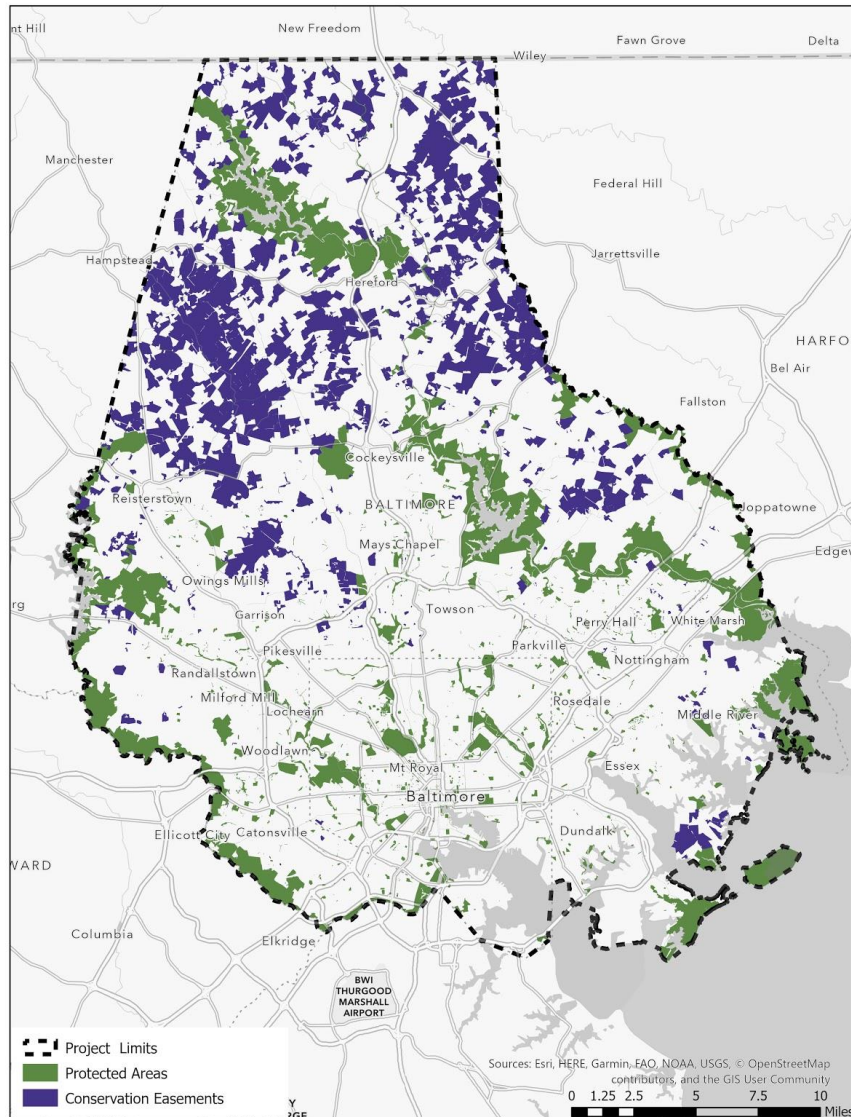
- Public properties

Preferred ground-mounted sites

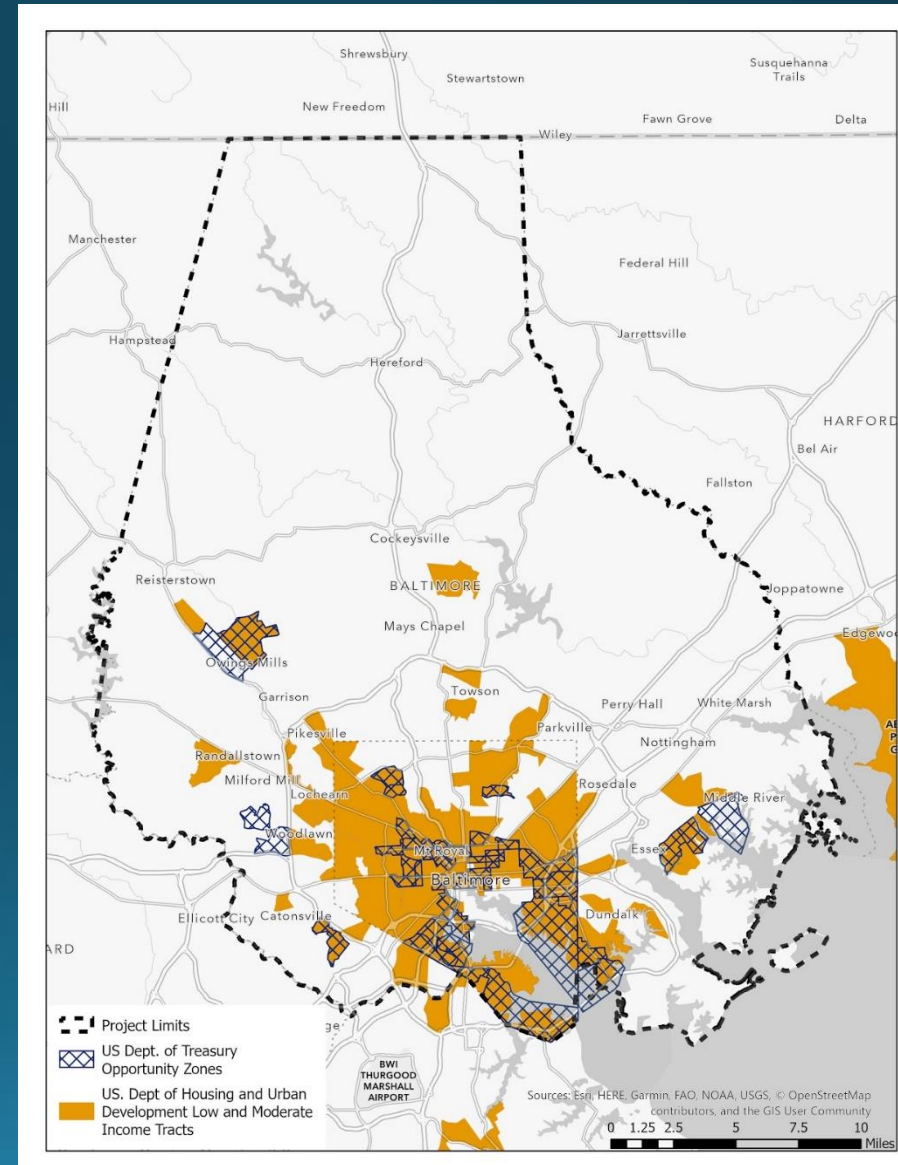
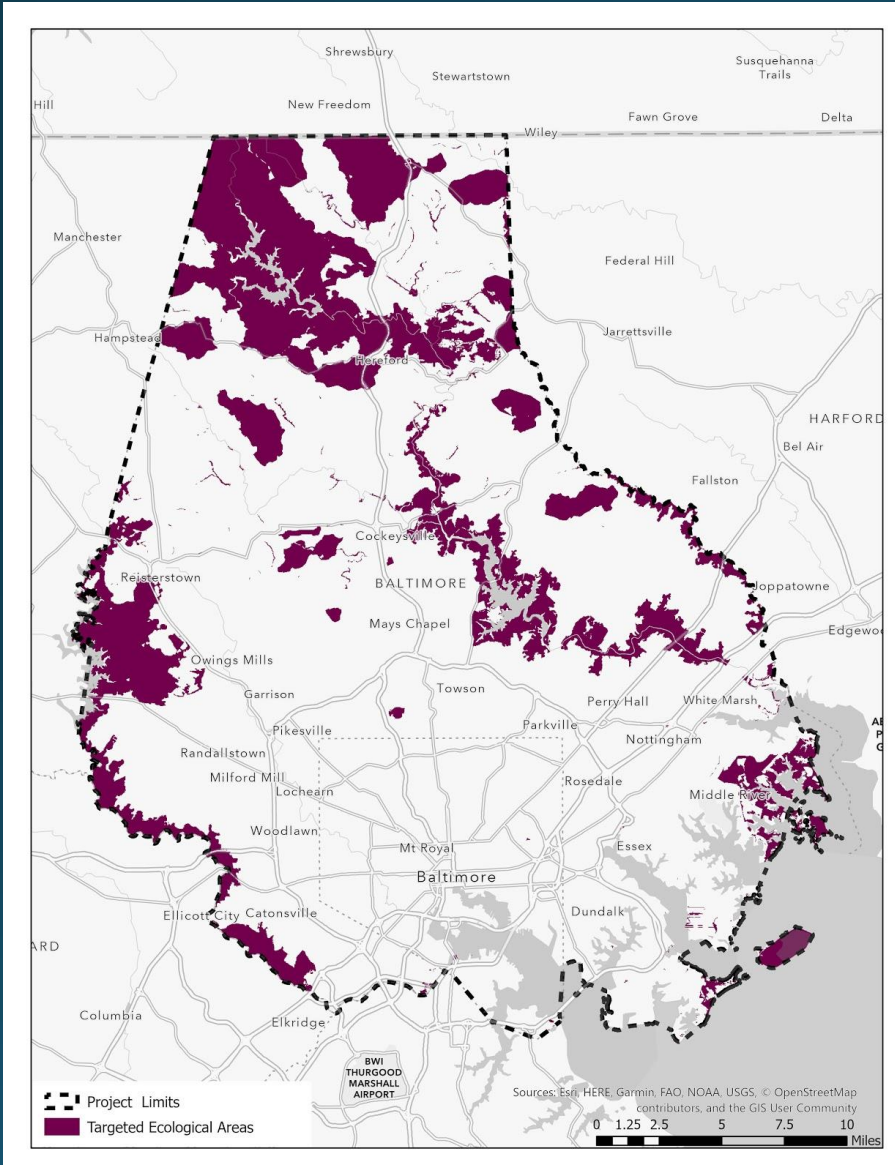
- Avoid environmental tradeoffs



Screening layers: Protected areas and easements



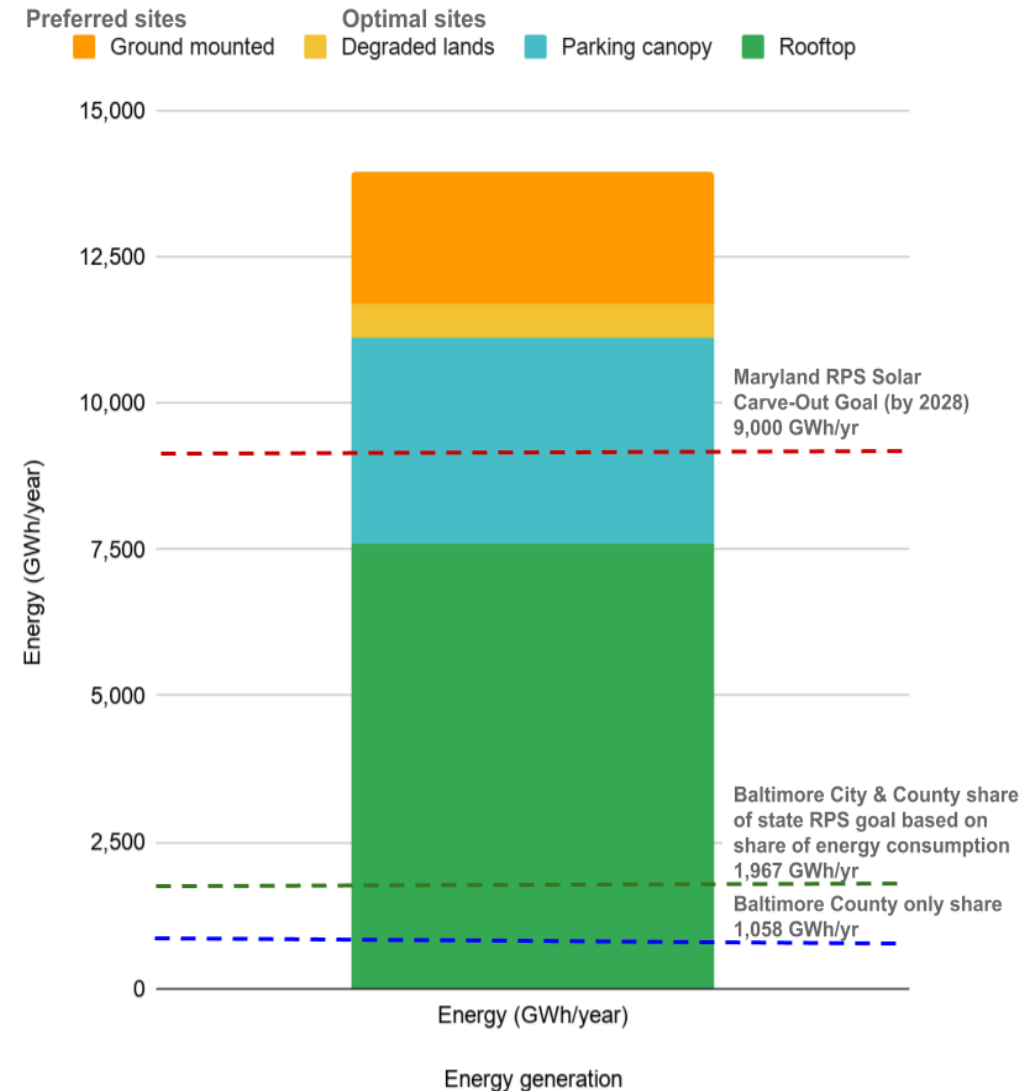
Screening layers: Targeted ecological areas and equity data



Results

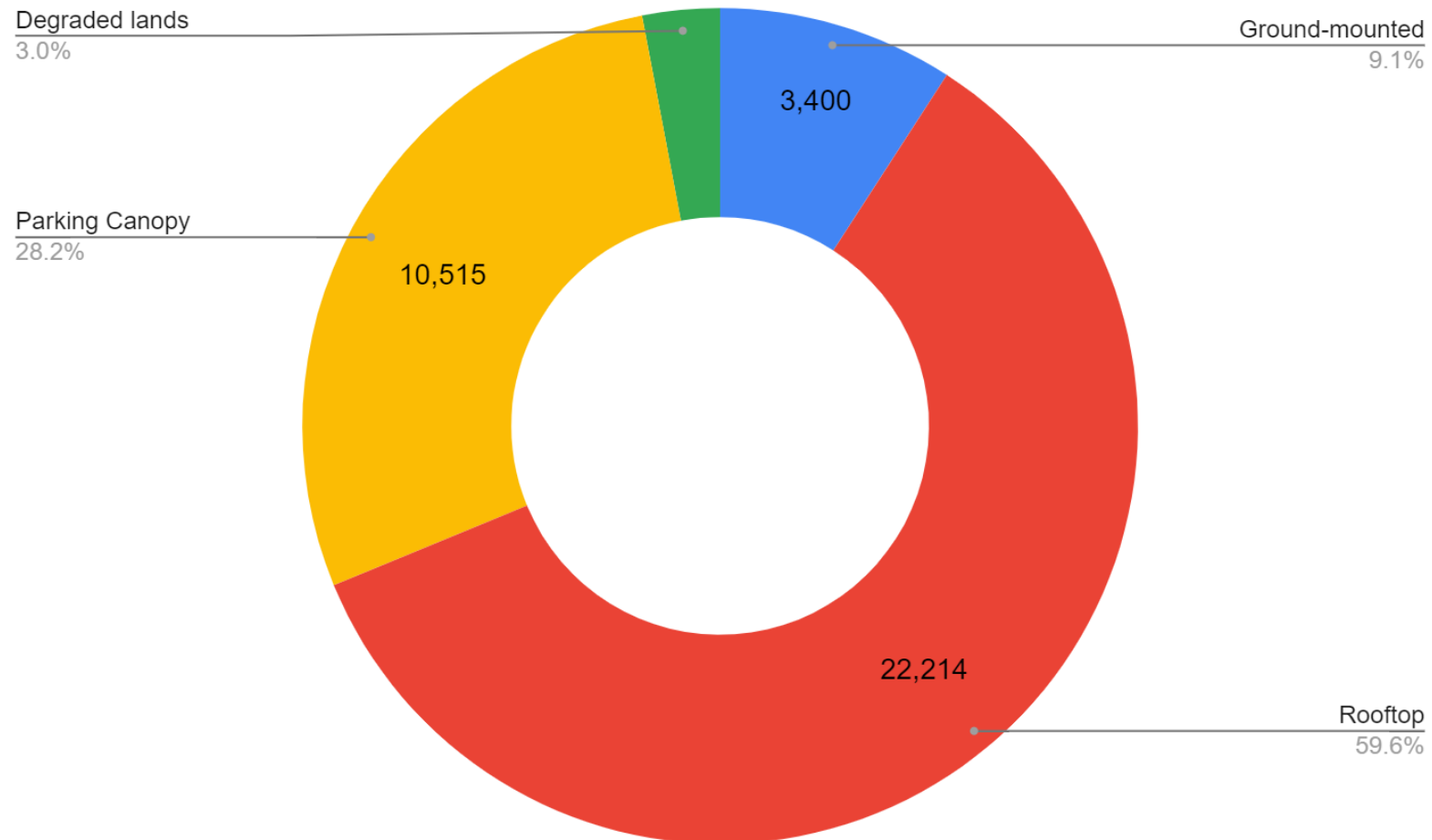
- Baltimore County and City have enough area in optimal sites meet or exceed a fair share of Maryland's RPS solar energy requirements

Energy generation from optimal and preferred ground-mounted sites in Baltimore County and City

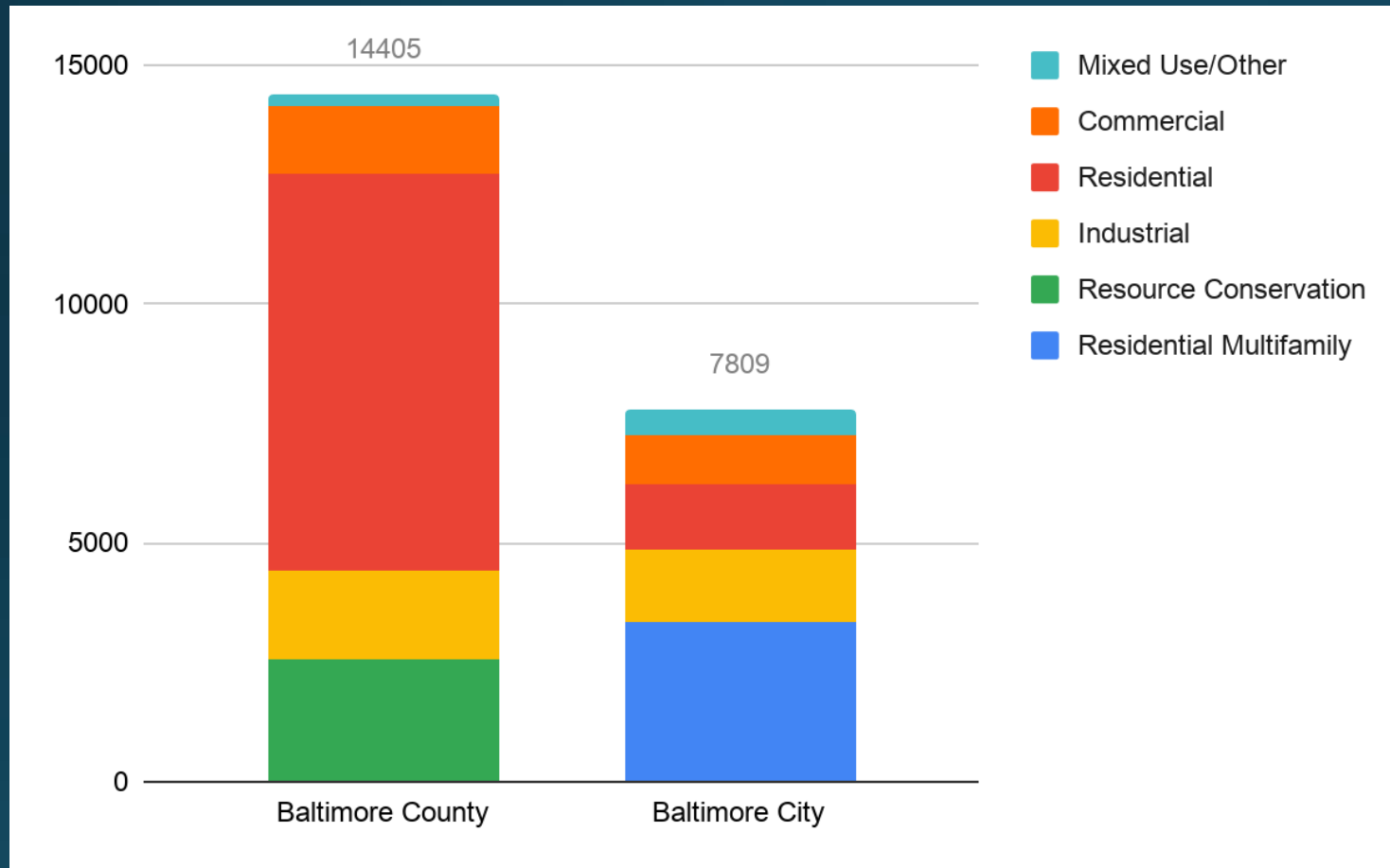


Results

Total optimal and preferred sites (acres) for solar energy development in
Baltimore County and City



Rooftop solar opportunities



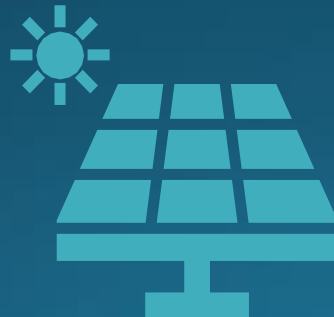
Baltimore County Public Buildings	Acres
County public schools	297
County-owned buildings (other)	442
Firehouses	14
Total	753

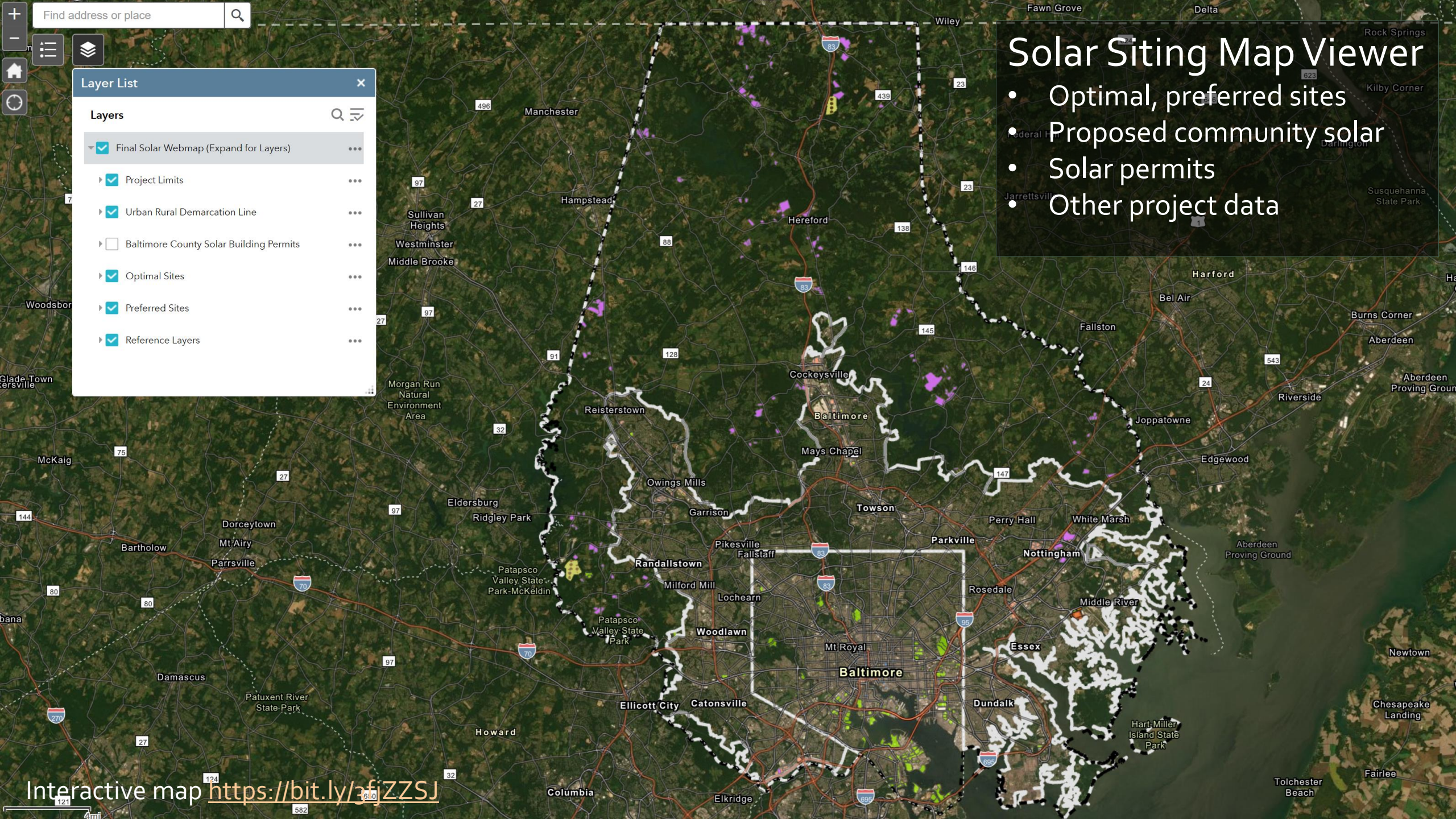
Recommendations

- Prioritize optimal sites for solar energy development, providing incentives or subsidies where needed
- Incentivize ground-mounted solar on preferred sites, away from prime farmland, forest and ecologically sensitive lands
- Without incentives, cost factors will drive solar energy development mainly to prime farmland

New Jersey Community Solar Pilot Program

- Point system for incentivizing:
 - Degraded lands
 - Product offering
 - Community and environmental justice engagement
 - Benefits to residential subscribers
 - Local jobs/training
 - Other benefits





Solar Siting Map Viewer

- Optimal, preferred sites
- Proposed community solar
- Solar permits
- Other project data



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